

-continued

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ggcaccgagu cggugcuuuu uu                               82

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1-65. (canceled)

66. A method of treating arthritis in a subject in need thereof, the method comprising:

administering, to a joint of the subject, a pharmaceutical composition comprising a pharmaceutically effective amount of a recombinant virus comprising one or more nucleic acids encoding a Clustered Regularly Interspaced Short Palindromic Repeats (CRISPR) gene-editing system, the system comprising:

- (i) a CRISPR Associated Protein 9 (Cas9) protein, and;
- (ii) at least one guide RNA targeting a gene selected from the group consisting of IL-1 α , IL-1 β , and a combination thereof, wherein:

the at least one guide RNA comprises a crRNA sequence that is complementary to a target sequence in an exon of the IL-1 α or IL-10 gene, and

the target sequence is adjacent to a protospacer adjacent motif (PAM) sequence for the Cas9 protein.

67. The method of claim **66**, wherein the arthritis is osteoarthritis.

68. The method of claim **66**, wherein the subject is a canine.

69. The method of claim **66**, wherein the subject is an equine.

70. The method of claim **66**, wherein the subject is a human.

71. The method of claim **66**, wherein the administering comprises intra-articular injection of the pharmaceutical composition into the joint of the subject.

72. The method of claim **66**, wherein the pharmaceutical composition is administered during surgery.

73. The method of claim **72**, wherein the pharmaceutical composition is a controlled release pharmaceutical composition.

74. The method of claim **66**, wherein the pharmaceutical composition is administered after surgery.

75. The method of claim **66**, wherein the recombinant virus is selected from the group consisting of a retrovirus, an adenovirus, an adeno-associated virus, a lentivirus, and a herpes simplex virus-1.

76. The method of claim **66**, wherein the recombinant virus is an adeno-associated virus (AAV).

77. The method of claim **76**, wherein the adeno-associated virus is of serotype 5 (AAV5).

78. The method of claim **76**, wherein the adeno-associated virus is of serotype 6 (AAV6).

79. The method of claim **66**, wherein the crRNA sequence is complementary to a target sequence the IL-1 α gene.

80. The method of claim **79**, wherein the target sequence is in exon 4 of the IL-1 α gene.